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PALEONTOLOGY.—*Annotated list of Pleistocene Mammalia from American Falls, Idaho.*¹ C. LEWIS GAZIN, U. S. National Museum. (Communicated by J. B. REESIDE, JR.)

Pleistocene vertebrate remains have been encountered at several localities along the course of the Snake River in southern Idaho. In the eastern part of the basin the fossils occur in loose sand and gravel and have been uncovered as a result of placer mining or quarrying for road material. At American Falls the fossils were discovered in a gravel quarry a short distance from the eastern end of the American Falls dam. The deposits in the pit consist of alternate layers or lenses of gravel and sand capped by an argillaceous mud, the bones occurring principally in the gravel and coarser sand.

While in Idaho during the summer seasons of 1929 and 1930, Dr. J. W. Gidley, accompanied by C. P. Singleton, visited American Falls and obtained for the National Museum a collection of vertebrate fossils. In 1934 the locality was investigated by the writer's party and additional material uncovered. The greater part of the collection consists of the remains of relatively large animals; apparently, small, fragile specimens were not readily preserved, hence the list is very incomplete.

The assemblage recognized is clearly Pleistocene and may represent a glacial stage as suggested by the presence of musk-ox remains. As to the portion of the Pleistocene represented no certain evidence is apparent in the known fauna. Dr. O. P. Hay² cited forms occurring in these gravels at various localities together with the fauna then recognized as from the Idaho formation in the western part of the basin and the whole was allocated to the Nebraskan stage. This procedure was unwarranted as the faunas may be quite distinct, certainly when comparisons are made with the Hagerman assemblage.

¹ Published by permission of the Secretary, Smithsonian Institution. Received February 12, 1935.

² HAY, O. P. Carnegie Inst. Wash. Pub. 322B: 268-269. 1927.

EDENTATA

Megalonyx cf. *jeffersonii* (Desmarest)

Megalonychid remains from American Falls consist essentially of two jaw portions and miscellaneous foot bones. Description of this and the mylodont material has been presented in an earlier paper.³ No new information is furnished by the additional material obtained in 1934.

Paramylodon harlani? (Owen)

Remains of mylodont sloth are scarcer in the gravel pit than those of *Megalonyx* and, since the sloth material collected by Gidley was described, a fourth metacarpal and an unguis claw have been added to the collection.

CARNIVORA

Cf. *Aenocyon dirus* (Leidy)

The distal portions of two humeri and an abraded phalange cannot be distinguished from the corresponding parts of the large dog *Aenocyon dirus* as represented at Rancho La Brea.

Canis sp.

An incomplete humerus, a tibia and a third metatarsal are recognized as belonging to a dog somewhat smaller than *Canis occidentalis* but larger than a coyote.

Urocyon? sp.

A small fox is indicated in the fauna by a fragmentary mandible portion. The specimen is without teeth but exhibits the alveoli for the posterior root of the carnassial, M₂ and the single rooted M₃.

Ursid sp.

The proximal end of a large femur and a fragmentary distal end of a humerus included in the collection are recognized as bear. The specimens suggest an individual about the size of the Alaskan brown bear, *Ursus gyas*, although the form represented may well be one of the large arctotheres. The fragment of a humerus is not sufficiently complete to show the presence or absence of an entepicondylar foramen.

Felis near *F. atrox* Leidy

Representing the cat is a fourth metacarpal, no. 13723 U. S. N. M., and a radius, no. 13747 U. S. N. M. The total length of the fourth metacarpal is 114 mm., this being smaller than the average in *Felis atrox* of Rancho La Brea but somewhat greater than the minimum figure given by Merriam and Stock.⁴ However, the fourth metacarpal appears relatively slenderer than

³ GAZIN, C. L. Jour. Mammalogy, 16: 52-60. 1935.

⁴ MERRIAM, J. C., and STOCK, CHESTER. Carnegie Inst. Wash. Pub. 422: 131-133, table 60, fig. 96. 1932.

the Rancho La Brea specimen figured. The radius is 312 mm. long, which is 5 mm. under the least figure given by Merriam and Stock for this element. The radius is comparable in size to radii in large individuals of *Felis leo*. It is possible that an unusually large individual of *Felis daggetti* is represented.

RODENTIA

Citellus sp.

In the scant collection of rodents from American Falls are five fragmentary mandibles of ground squirrel. In only one of the jaws are any teeth preserved and these are so badly worn that the cusp pattern is entirely obliterated. The specimens represent a small species apparently close in size to *Citellus richardsonii*. A resemblance is also seen to *Citellus elegans*, although the fossil jaws differ somewhat from both modern forms in having a relatively longer cheek tooth row, as indicated by the alveoli.

Thomomys cf. *townsendii* (Bachman)

Pocket gophers are represented by eight mandible portions and a number of limb elements. Four of the jaws retain P_4 and in one the second molar is preserved. The species is distinctly large and compares favorably with *Thomomys townsendii*, now living in the vicinity of American Falls. Comparison, however, with several specimens of *T. townsendii* show the teeth in the fossil jaws to be somewhat wider than the average in living specimens.

Castor sp.

The beaver material includes the greater part of a tibia, the distal end of a femur and two metapodial fragments. These indicate a beaver somewhat larger than *Castor canadensis*, approaching in size the later Pliocene beaver found at Hagerman. Possibly the species *Castor accessor* Hay is represented although no teeth were found on which to make a comparison.

Erethizon sp.

A single left ramus of a mandible without cheek teeth and retaining only the base of an incisor is recognized as porcupine.

LAGOMORPHA

Lepus sp.

A relatively large hare is indicated by several fragments of tibiae and femora, the distal end of a humerus, two calcanea, two metapodials and phalanges. The form represented may be *Lepus townsendii* or *Lepus californicus*. From the age of the deposits it is unlikely that *Hypolagus* is included.

Sylvilagus? sp.

A fragment of a lower jaw without teeth, and a few fragments of limb bones show the presence of a second and distinctly smaller leporid. The jaw

is about the size of that in the brush rabbit, *Sylvilagus bachmani*. Although the form represented may be a species of *Brachylagus*, the living *Brachylagus idahoensis* possesses a somewhat smaller jaw.

PROBOSCIDEA

Mammut americanum (Kerr)

Included in the mastodon material is a right mandibular ramus, No. 13701 U. S. N. M., in which is preserved a moderately worn last molar. The specimen corresponds closely to other specimens in the National Museum identified as this species.

Elephas columbi? Falconer

Two maxillary portions in the collection, one of which No. 13703 U. S. N. M., retains a partially worn last molar and the other, No. 13702 U. S. N. M., a badly worn second molar in addition to the third, are apparently to be referred to the columbian mammoth.

PERISSODACTYLA

Equus cf. occidentalis Leidy

Horse remains consist of an assortment of teeth and foot bones. The teeth are appreciably smaller than in *Equus pacificus* as represented at Christmas and Fossil Lakes in Oregon, and somewhat smaller than the type of *Equus idahoensis*. The specimens do not differ greatly in size from *Equus occidentalis* material from Rancho La Brea but the enamel pattern is slightly more complicated, comparable in this respect to the type of *E. occidentalis* as illustrated by Leidy.⁵ The pattern on the teeth varies considerably between specimens but is distinctly simpler than in most teeth described as *Equus complicatus*.

ARTIODACTYLA

Camelops cf. hesternus (Leidy)

Perhaps the most abundant material obtained from the gravel deposit is that of camel. This includes considerable limb and foot material and an assortment of upper and lower teeth. There are also a maxillary portion of the skull with three molars, No. 13718 U. S. N. M., a premaxillary-maxillary fragment, No. 13719 U. S. N. M., with the third incisor and alveolus for the canine, and three incomplete mandibles. One of the lower jaws, No. 13720 U. S. N. M., possesses a complete, though well worn, cheek dentition. The form is apparently close to *Camelops hesternus* as identified at Rancho La Brea, and probably identical to *Camelops minidokae* Hay⁶ from a gravel bed

⁵ LEIDY, JOSEPH. U. S. Geol. Surv. Terr. Rept., 1: pl. 33, figs. 1-2. 1873.

⁶ HAY, O. P. Op. cit., 90-93, pl. 8, figs. 2-3. 1927.

near Minidoka, Idaho. The American Falls jaws do not show evidence of a vestigial P_3 seen in the type of *C. minidokae* but this character may not have been persistent in the Minidoka camel as the teeth are otherwise similar to those in the American Falls form. Comparisons between the premaxillary-maxillary portion and the type of *Camelops kansanus* as illustrated by Merriam⁷ show the alveoli for I^3 and C to be somewhat larger but less widely separated in the American Falls specimen. However, no important differences in teeth and foot material were observed when comparisons were made with *Camelops kansanus* from Hay Springs, Nebraska.

Cf. *Antilocapra americana* (Ord)

Two humeri, a tibia, calcaneum and an incomplete anterior cannon bone in the collection are nearly identical with those in the living prong-horn antelope. It is interesting to note that these elements with the possible exception of the cannon bone can be closely approximated in the mule deer, *Odocoileus hemionus* and in the columbian black-tailed deer, *Odocoileus columbianus*.

Bison alleni Marsh

Nearly all of the bison material in the collection, which is almost as abundant as camel, is referred to *Bison alleni*. A cranial portion, No. 13692 U. S. N. M., including the right horn-core and a somewhat larger isolated horn-core, No. 13693 U. S. N. M., are so close to the type of *B. alleni* that the identity is not questioned. In addition to the horn material are portions of seven jaws, a number of loose teeth and a variety of limb and foot bones. The size of the limb and foot bones in addition to the heaviness of the horns indicate an animal of considerable robustness.

Bison sp.

An isolated bovid cannon bone, No. 13713 U. S. N. M., in the collection is considerably smaller than those referred to *Bison alleni* and compares favorably with the corresponding element in a small individual of *Bison occidentalis* as recognized in a Pleistocene collection from Riverton, Minnesota.⁸

Symbos cavifrons (Leidy)

The collection includes two incomplete musk-ox skulls, a portion of a palate with two molars on each side, a fragment of a lower jaw and a few isolated teeth. The two skulls exhibit both horn-cores and the occipital region, but the rostral portion is missing in one and only partially preserved in the other. The skulls are characterized by unusually robust horns, the extremities of which extend well out from the skull. It may be noted that in much of the described skull material referred to *Symbos cavifrons* the horns are less robust and more rapidly tapering than in the type as illustrated by

⁷ MERRIAM, J. C. Univ. Calif. Pub. Bull. Dept. Geol. 7: 305-323, figs. 10a-10b. 1913.

⁸ HAY, O. P. Proc. U. S. Nat. Mus. 63: art. 5: 1-8, pls. 1-2. 1923.

Osgood,⁹ whereas the American Falls specimens have even heavier and longer horns which stand out from the side of the skull somewhat more than in the type. It is estimated that the distance between the extremities of the horn-cores on one of the specimens, though the tips are not complete, would be about 680 mm. The anteroposterior diameter at the base of the horn is about 115 mm. and the vertical diameter about 102 mm.

⁹ OSGOOD, W. H., Smithsonian Misc. Coll., Quart. Issue, 3: pt. 2, 173-185, pl. 40, fig. 1, pl. 41, fig. 1. 1905.

BIOLOGY.—*Longevity and fertility in the pond snail, Lymnaea columella.*¹ CHARLES P. WINSOR AND AGNES A. WINSOR. (Communicated by RAYMOND PEARL.)

The essential preliminary to any reasoned, quantitative discussion of population problems is accurate knowledge of birth and death rates. Unfortunately, such knowledge is almost completely non-existent. Aside from our knowledge about man, virtually everything that we know of birth and death rates in other forms is due, directly or indirectly, to Pearl. Under these circumstances it seems legitimate to add a certain amount of data, even though it fails to conform in all respects to the standards set by Pearl on *Drosophila*.

The data here presented deal with duration of life and fertility in the pulmonate gastropod *Lymnaea columella*. Some account of the biology and laboratory husbandry of this animal has already been given by Baily (1) and by ourselves (7).

The conditions under which the observations were made may be stated briefly. Eggs from wild snails isolated in the laboratory were collected and separated before hatching; from each egg mass 10 eggs were placed in one finger bowl and 2 eggs in each of five others. A total of 180 snails was used in each series. Leaf lettuce was used as food, except for a period of about four weeks during which iceberg lettuce was used. The substitution was unavoidable, and unfortunate. Lettuce and water were changed three times a week; the conditions were arranged so that light and temperature were reasonably uniform or all animals.

The wild parents of the snails were collected in two ponds in the vicinity of Baltimore, designated here as the Falls Road pond and the Boyce Avenue pond. In addition to these wild ancestors of known origin, two snails isolated from laboratory aquaria furnished eggs for

¹ From The Department of Biology of The School of Hygiene and Public Health, The Johns Hopkins University, and The Biological Laboratories, Harvard University. Received March 14, 1935.